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PRESERVED FASCIA AND TENDON HOMOGRAFTS

by
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At the present time problems of transplanting of preserved tissue have been considerably publicized. This is particularly true of bone homografts (G.I.Borkov, G.V.Golovin, N.P.Demichev, A.S.Imamaliev, P.P.Kovalenko, I.L.Krupko and S.S.Tkachenko, M.I.Panova, S.S.Ivanchev).

Experience with the use of preserved homofascia and tendons in the clinic apparently has not received sufficient literary treatment.

For the most part, both in this country (Iu.V.Beringer and A.A.Sykov, R.A.Klepikova) and abroad/mostly experimental works have been devoted to the fascia homografts. / insert: Valentian Puer). Some research workers (Valentin) believed that cells of the fresh fascia homografts remain viable after being transplanted, however, later works of scientists in our country (Iu.V.Beringer and A.A.Sykov) have convincingly shown that the transplanted homoplastic fascia grafts gradually become absorbed and substituted for by connective tissue.

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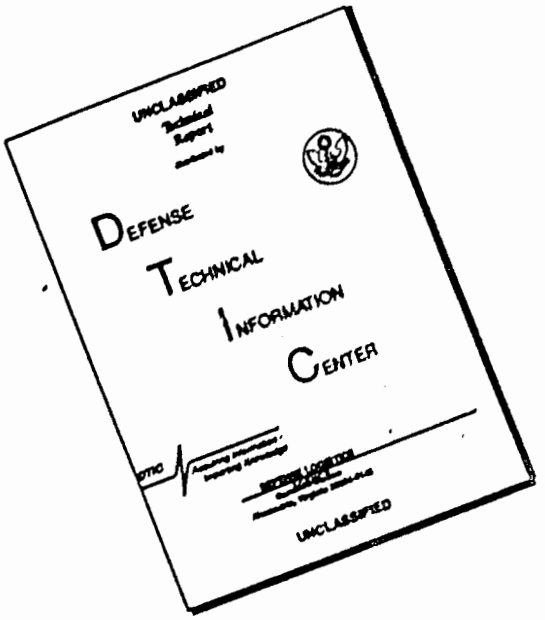

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Problems of tendon homografts have been studied in research works of S.L.Bogdiarova and G.I.Lavrishchova, Z.G.Lakshina and Cordrey.

In these works, they have shown that the transplanted tendons are gradually resorbed and substituted for by tendon-like tissue. In the opinion of Z.G.Lakshina, in case of tendon homografts there is more frequent encapsulation of the homograft than its resorption and substitution by tendon tissue.

Taking into account the insufficient discussion in literature on the practical use of preserved fascia and tendon homografts, we decided to share our modest experience, accumulated at the clinic of traumatology and orthopedics at the Military Medical Academy (manager of S.M.Kirov) during the period from 1957 to 1963.

Preserved fascia and tendon homografts were used in the treatment of some 58 patients.

Preparation of homo- fascia and tendon material was done at the tissue preservation laboratories of the Leningrad scientific research institute of blood transfusion (Director N.S.Kartashevskii) and at the Military Medical Academy (S.M.Kirov memorial) (Director - candidate for Med.Sciences S.V.Rybkov). Transplant material was taken from cadavers of accident victims in the ages of 40 to 60years. Usually various sizes of fascia lata wer flaps were were taken from the thighs and tendons of the length of the perineal muscle.

Methods and periods of preservation of graft tissue are

presented in Table 1.

Table 1

Methods and Periods of Preservation of Tissue for Grafts

Method of preservation	Preservation periods in days				Total
	5-30	31-90	91 - 180	181 - 176	
In the Beliakov solution					
31-Z	22	5	3	8	37
Freezing at -10°	9		2	3	14
Same at -25°	2	4	1		7
Total	32	9	6	11	58

More frequently used were transplants (grafts) which had been preserved in the Beliakov solution 31-Z for periods of 5 to 176 days. It should be noted that during the first 30 days, fascia grafts, preserved with this method, preserved sufficient stability, even though outwardly they no longer had the appearance of fresh tissue.

R.A.Klopikova's research studies have shown that with preservation of homografts fascia in A.D.Beliakov's solution, microscopical examination during the first first 10 days revealed swelling of the collagen fibers and the appearance of cells with deformed nuclei. With prolonged periods of preservation, degenerative changes were more marked, and 30 days later the grafts became edematous and degenerative changes even more striking. In the opinion of the author, preservation in A.D.Beliakov's solution 31-Z is permissible up to 30 days,

but preferably during 10 to 15 days.

Our clinical observations have shown that during the first 2-3 months, homografts preserved in Belinkow's solution, may be successfully transplanted.

Grafts, preserved by freezing at the temperature of -10° and -25°, in spite of the long periods (of preservation), and preserved their stability even after thawing out had the appearance of fresh tissue. They were better preserved at the temperature of -25°.

Fascia and tendon homografts were done on 42 men and 16 women at the ages of 15 to 62 years. More frequently operations were done on patients in the ages of 21years to 40 years (42 persons). The nature of surgical intervention and the results of surgery are given in Table 2.

Table 2.

Nature of Surgical Intervention

Type of operation	Number of patients	Results of operation: Good	Bad	Unknown (insufficient period of time)
I.Krupke operation for habitual dislocation of shoulder	15	7	2	6
Reconstruction of knee joint tendons	19	8	2	9
Reconstruction of torn Achilles tendon	11	10	-	1
Reconstruction of damaged long head of bicipital muscle	3	3	- /	-
Bonnal's operation for clavicle dislocation	4	3	1	-
Other operations	6	3	- /	3
Total	58	34	5	19

During the postoperative period, suppuration was observed only in 1 patient who has had Bunnel's operation for an old clavicle dislocation. The ligament apparatus (or postop system?) was reconstructed with homograft of fascia, bound with think silk ligature. After the removal of silk ligatures and fascia, suppuration was eliminated. None of the patients showed any general or local signs of allergy reaction.

In the I.L.Krupko's operation, fascia homograft have been used on 15 patients with habitual dislocation of the shoulder.

The I.L.Krupko's operation consisted in the creation of artificial coracoid and shoulder and scapular and shoulder ligaments. The first ligament prevented dislocation of the shoulder downwards, and the second, forward. With an opanlette incision of the skin, continuing it towards the axis of the scapula, the operation process was bared and the outer portion of the scapular axis, and following a blunt separation of the deltoid muscle, also the great tuberule. At three 3 points, with a drill bone canals were marked, and through those fascia homografts 1.5 - 2 cm. wide and 20-25 cm. long were passed. The ends of the fascia were sewn together so that it formed a closed triangle (Fig.1). During the postoperative period the extremity was immobilized ("fixated") during 1- months on abduction arm splint.

Fig. 1. Diagram of I.L.Krupko operation for habitual luxation of shoulder.

Of the 9 patients whose treatment has been completed, good results were obtain on 7. Negative results ("Postcasse") were observed in 2 patients; there were explained by disruption of postoperative regimen, in premature removal of immobilization as well apparently insufficient sturdiness of the fascia homografts (which had been preserved over 4 months).

Reconstruction of the cruciel and inner lateral ligaments was done on 19 patients. Reconstruction of the anterior crucial ligament was done on 13 patients, that of the frontal crucial and inner lateral on 5 patients, and one female patient only had reconstruction of the inner lateral ligament (Fig. 2)

Fig. 2 Method for reconstruction of the anterior crucial and inner lateral ligaments with fascia homografts.

Fascia homografts were pressed through osseus canals made in the tibia and femur; the knee joint was flexed at an angle of 140-150°, after which fascia was tightened and fastened by means of pulling it through an additional canal or with bone nails.

In the cases where the inner lateral ligament had to be reconstructed, a transverse canal was made in the lower third of the femur, fascia was passed through it and fastened.

In all of the cases where it was necessary to reconstruct the inner lateral ligament, a transverse canal was made. In all cases the extremity was fixated with plaster

bandage for 6 weeks.

During the postoperative period in 2 patients there was observed synovitis for a long period of time; this possibly could be explained as a reaction to the homofascia remaining in the cavity of the joint.

Of the 10 patients who have had the course of treatment results were positive in 8, and negative in 2. In these patients there was the symptom of "pull-out drawer", and there were pains in the knee joint.

As an illustration on the use of preserved fascia homografts for the reconstruction of the cruzial ligament in the knee joint, let us quote from a case history.

Case history

Patient Sh., 26 years (clinical history No.14636). In November, 1956, had a rupture of the anterior cruzial ligament and internal meniscus of the left knee joint. For a long time he has had conservative treatment, however pains continued in his knee joint and he walk unsteady in walking.

In October, 1957, he entered the clinic. Diagnosis was rendered of the rupture of the anterior cruzial and inner lateral ligaments and the inner meniscus of the left knee joint. On 10-XI-57, under ether-oxygen intratracheal anesthesia, operation was performed for removal of the inner meniscus, reconstruction of the anterior cruzial and inner lateral ligaments. The cruzial and inner lateral ligaments were reconstructed with fascia homograft, 25 cm. long and 3 cm. wide, which had been preserved by deep freezing at the temperature

at -76° and stored for [illegible] 6 days at the temperature of -35°. The wound healed with primary intention. The extremity was immobilised for 2 months with plaster splint.

At control check up [illegible] 10 months later (after the operation) there was found satisfactory function in the knee joint, no symptom of "pulled out drawer" was noted. Now it has been 6 years and 2 months since the operation.

In the operation for reconstruction of ruptures Achillies ligament, fascia homografts were used on 10 patients. In 8 of thjese there were [illegible] recent ruptures, 2 had old ruptures.

In case of recent ruptures, the operation consisted of application of sutures on the ends of torn ligament, and the wide site of juncture of the ends of the ligaments was wrapped in fascia homograft and fastened with separate sutures. In surgical treatment of old ruptures, in addition, there was
cut out
fashioned from the central end an area of the ligament and then flapped over like a bridge into the peripheral end and fastened with silk sutures. During 6 weeks the extremity remained immobilised in plaster bandage in the position of plantar flexure of the foot and the knee joint.

By this time, treatment has been completed in 10 patients - good results were had in all of these cases. For an illustration, we quote from a clinical history.

Clinical history

Femal patient G., 30 years. During physical exercises, on 2-17-62, while jumping, she squatted on the edge of the mat

and obtained a complete subcutaneous rupture of the Achilles ligament.

On 2-22-43 operation was done for reconstruction of the ruptured Achilles ligament with the aid of fascia homograf,t. The wound healed with primary intention. The plaster bandage was removed after 6 weeks, this was followed by physical therapy and therapeutical exercises.

Now it is 1 year and 6 months since the operation. The patient has no complaints, function has been fully restored. The patient continues her physical exercises, and successfully participated in races (contests).

On 4 patient fascia homografts were used during typical Bankart operation for the treatment of clavicle dislocation. On 3 patients results were good, one was bad. The latter patient had suppuration, the fascia graft was removed, the dislocation restored.

In the operation for the reconstruction of the long head of the biceps muscle of the shoulder on 3 patients we used fascia homografts for the purpose of prolonging the long head and fastening it to the greater tubercle. Good results were had on all of these patients.

In addition, on 4 patients fascia homografts were used for the purpose of creating interposition in arthroplastic; on 1 patient for habitual dislocation of the ligaments of the fibular muscle and on one female patient for the operation of lengthening of the Achilles ligament.

Preserved ligament homografts have been used on 2 patients: on male patient B. in surgical treatment of the habitual dislocation of the head of the radius and on male patient V. in treatment of old rupture of the Achillen ligament.

Patient B. entered the clinic in May, 1957, with complaints of pain in the left elbow joint. Diagnosis: habitual dislocation of the head of the radius of the left forearm.

6-25-57: operation was done for reconstruction of the annular ligament. Wound healed with primary intention. It is now 6½ years since the operation. There is good function in the elbow joint, the habitual dislocation of the head of the radius has been eliminated.

Clinical observations show that in a whole number of operations, surgical intervention may be successfully used with preserved fascia and ligament homografts. This permits to dispense with a second operation and using grafts of required size. No general allergy reaction was observed on any of the patients in response to the homografts transplants. After the reconstruction ("creation") of the crucial ligament in the knee joint with fascia homograft on 2 patients there were observed persistent synovitis during the postoperative periods.

The problem of the use of preserved fascia and ligament homografts needs further study and accumulation of clinical observations.

Literature is not transcribed

-kwb
10-21-66

For Dr. Raleigh

Tissue Bank